INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

C-O-N-F-I-D-E-N-T-I-A-L

50X1-HUM

COUNTRY **Poland**

SUBJECT **Cembertowicz Process of Soil Stabilization**

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a report containing information concerning a process of using electricity to stabilize earth.

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INFORMATION REPORT INFORMATION REPORT

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THE CEMBERTOWICZ PROCESS OF SOIL STABILIZATION

Introduction 50X1-HUM

this process was first discovered and used by a engineer, prior to WW II. It was during WW II that Professor Romuald CEMBERTOWICZ of Poland worked in the further development of this process. After WW II CEMBERTOWICZ was assigned to the Gdansk Polytechnic in GDANSK and was given a large financial grant by the Polish Government to further develop this process.

1. Cembertowicz's Process of Electro-Osmosis

From 1945 to 1955, Professor CEMBERTOWICZ never made public the actual 50X1-HUM
method of operation of his process. He always personally supervised this process when it was applied.

This process could only be applied successfully within a limited belt (area) which was approximately 10 m wide and from 15 to 50 m long. In cases where wide areas were being stabilized, repeated processes had to be applied. In order to be successful it was applied continually for a period of 15 to 30 days and at times longer depending on the type of terrain which was being stabilized. The actual process of electro-osmosis was attained by driving two metal bars, i.e., I-beams, into the ground within the limited area of the foundation under which the earth was to be stabilized. The metal bars were usually sunk about three to four meters below the level of the foundation. After this was accomplished, a direct current of electricity was sent through the steel bars which started the process of electro-osmosis. The electricity used in this process was taken from any commercial source in the vicinity of the project. The electricity was sent through a transformer which was usually set up for that purpose. The transformer lowered the voltage to approximately 380 volts and changed the current from alternating current to direct current. The earth's water was used as a conductor of the electric current. The process was further based on the utilization of kine-chemical deposits in the earth which were moved to a desired area with the aid of the water and the electric current. The mechanics of this phenomenon could be compared with the workings of a suction-pressure pump as well as electrical reaction where a cathode will attract certain minerals and chemicals whereas an anode will reject the same. For example, the following minerals being attracted to a cathode: calcium, 50X1-HUM
magnesium, quartz, and bauxite.

By taking advantage of this electrical reaction of the cathode and the anode, substantial chemical and mineral deposits could be drawn to a desired area within the earth. This became petrified sandrock and bound the loose earth, thus strengthening the foundation of the sagging structure.

In cases where the earth lacked sufficient quantities of the proper chemicals and minerals, different types of emulsions were injected into the earth in the immediate area where the electro-osmosis process was being conducted. The emulsions usually consisted of calcium, magnesium, quartz, bauxite, or marl. These were mixed with either water or a thin solution of asphalt. The mixture was then pumped into specially dug holes approximately three meters deep in the

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immédiate area of the project. When an asphalt solution was used it was necessary to use imported asphalt which was far superior to domestic asphalt. Imported asphalt contained only one-half percent by volume paraffin as compared with the domestic product which contained four percent by volume. The high percentage of paraffin present in the domestic product caused difficulties for proper binding.

2. Actual Application of the Cembertowicz Process

This process was used for the first time in 1949 in WARSAW. Several months after the East-West Tunnel (Wschod-Zachod) was completed under Ulica Krakowskie Przedmiescie in the vicinity of the ancient St Ann's Roman Catholic Church, the church's foundation began to sink and the interior walls began to crack. After extensive investigation it was established that the construction of the tunnel was responsible for the church's sinking. Polish engineers constructed supporting walls as well as injected concrete veins into the surrounding earth.

CEMBERTOWICZ was called on to apply his process. After a period of time the foundation was again stabilized. It was never verified whether it was CEMBERTOWICZ's method which was responsible for the stabilization or whether it was a combination of the three methods applied. Nevertheless the Polish Government awarded and praised CEMBERTOWICZ as being the one responsible for saving the ancient structure.

The second time his process was used was in 1954 in China. The Complete Objects Export Central (Centrala Eksportu Kompletnych Objektow -CEKOP) was contracted to construct a sugar mill in that country. Due to faulty geological surveys and probings, the mill's foundation began to sink. CEMBERTOWICZ was sent to China to apply his process. This time it proved to be a complete success and he was hailed as the man responsible for saving the prestige of the Polish engineers who were responsible for the construction of the sugar mill.

CEMBERTOWICZ experimented extensively for 10 years in conjunction with Engineer Zbiegniew MORON, the director of the Central Bureau of Mining Projects in the Silesian mining region. They attempted to apply this process in the excavation of new mine shafts and strengthening old ones. After lengthy tests it was established that this process was impractical in this field, and the old method of freezing weak layers of earth when new shafts were sunk was most practical and most economical.

3. General Evaluation of the CEMBERTOWICZ Process

This process was found to be very costly due to the large amount of electric current which was needed to accomplish a successful end. The added injections of emulsions were also costly in materials and man-hours. However the greatest fault of the process was that it could only be conducted in a limited area. this method would never be used in road and railroad construction due to the limited areas of its workability and the lengthy time needed to accomplish a thoroughly satisfactory end. 50X1-HUM

4. General

this method of soil stabilization was known to the Soviets 50X1-HUM the Soviets did utilize the method of electro-osmosis for the purpose of examining the consistency of the earth where they intended to construct future projects. the Soviets had a mobile electro-osmosis unit which was utilized for this purpose. they used this in place of the old method of drilling for samples of earth on the desired terrain.

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